

Title: "listen: there's a hell of a good universe next door; let's go."

Abstract: Scientific research is key to our nation's technological and economic development. One can attempt to focus research toward specific applications, but science has a way of surprising us. Think for example of the "charge-couple device", which was originally invented for memory storage, but became the modern digital camera that is used everywhere from camera phones to the Hubble Space Telescope. Using digital cameras, Hubble has taken pictures that reach back 12 billion light-years into the past, when the Universe was only 1-2 billion years old. Such results would never have been possible with the film cameras Hubble was originally supposed to use. Over the past two decades, Hubble and other telescopes have shown us much about the Universe -- many of these results are shocking. Our galaxy is swarming with planets; most of the mass in the Universe is invisible; and our Universe is accelerating ever faster and faster for unknown reasons. Thus, we live in a "hell of a good universe", to quote e.e. cummings, that we fundamentally don't understand. This means that you, as young scientists, have many worlds to discover.